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THE FUTURE IS HERE

By Evan Bost

As we approach a new decade, we anticipate developing technologies that promise major improvements in home construction.

While some of these technologies have been buzzwords for several years, they have made great strides in recent months. Others have resulted from fascinating innovations in material or manufacturing science. I find them all interesting and look forward to watching their development and positive impact on sustainability, affordability, and lifestyle in the 2020s.

The brilliant concept of computer-guided additive manufacturing, or 3D printing, has struggled to scale in the housing industry as quickly as many hoped. Nevertheless, a few US companies have progressed toward a 3D-printed home reality in the last year, while others work toward 3D-printed design elements. In July 2019, S Squared printed a 500-square-foot home from concrete in Patchogue, New York, in less than twelve hours for around \$2,000 for the structure. The company has since announced plans to build hundreds of affordable housing units. A Dutch company, Aectual, is printing custom flooring designs, facade panels, built-in furniture, and textural wall panels. I believe the next decade will see enormous opportunity for 3D-printed designs for everything from floor, wall, and ceiling panels to custom light fixtures and trim details.

Thermo-responsive hydrogel roofing and cladding materials are the most interesting building science products I've read about lately. Hydrogel refers to a material that osmotically absorbs water and swells with moisture due to its hydrophilic internal structure. Several companies are exploring thermo-responsive hydrogel coatings on roofing and cladding materials that absorb water when it rains and "sweat" it out when exposed



to hot temperatures. As the perspired water evaporates off the surface, it effectively cools the building with no energy expense. Hydrogels can be naturally derived from cellulose or created with synthetics to achieve desired results. Preliminary studies show that hydrogels can reduce building surface temperatures for up to three hours during peak daytime heat.

Carbon Fiber Reinforced Concrete (CFRC) is not a new development, but its usage could gain traction in the coming years, greatly expanding architectural possibilities due to its strength and reduced weight. Concrete is a hard material that can withstand enormous pressure yet requires reinforcement to achieve flexibility under tension. For over a century, steel has been the reinforcement material of choice, even though it's extremely heavy and corrodes over time. Enter carbon fiber, a lightweight



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material that is strong, noncorrosive, and less taxing on the environment to produce and transport. Although it's currently expensive, costs will decrease as competition enters the market and the benefits of lighter, stronger, and more durable concrete are realized. CFRC is more commonly used in Europe but could increasingly make its way across the pond.

Bost Custom Homes has a proven history of utilizing innovative building products and techniques. We will continue to pursue innovation in residential construction excellence and are prepared and excited to advise on and deliver innovative products and techniques for our clients.◆



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